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E7.3 107.1.0

CR-133061

A STUDY OF MORPHOLOGY, PROVENANCE, AND MOVEMENT OF DESERT SAND SEAS IN
AFRICA, ASIA, AND AUSTRALIA

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1 July 1973

Type I Progress Report for Period 1 May - 30 June 1973

Prepared for:

Goddard Space Flight Center
Greenbelt, Maryland 20771

Publication authorized by the Director, U.S. Geological Survey

N73-26317

Unclas
G3/13 00710

CSCI 08M

E73-10710) A STUDY OF MORPHOLOGY,
PROVENANCE, AND MOVEMENT OF DESERT SAND
SEAS IN AFRICA, ASIA, AND AUSTRALIA
Progress Report, 1 May - 30 (Geological
Survey) 5 p HC \$3.00

Type I Progress Report
ERTS-A

- a. Title: A Study of Morphology, Provenance, and Movement of Desert Sand Seas in Africa, Asia, and Australia

ERTS-A Proposal No.: SR 131

- b. GSFC ID No. of P.I.: IN 402

- c. Problems relating to progress:

A considerable time lag between the placing of our orders and the receipt by us of bulk color composite images continues and has greatly delayed our completion of color mosaics of the test areas. This delay in turn has affected preparation of the transparent overlays that are to form thematic maps showing the relationship between desert morphologic trends and surface winds. Meanwhile, work continues in the inventorying and classifying of desert morphologic features as observed on ERTS imagery, in gathering available wind data for the test sites, and in the collection of ground truth data, in the form of field samples and corroborating photography.

- d. Discussion and plans:

Both ERTS coverage and surface wind data are essentially in hand for 3 areas: the Thar Desert of India - Pakistan, the Namib Desert of Southwest Africa, and the White Sands dune field of New Mexico, U.S.A. It is our intention for the present to concentrate our efforts on trying to obtain immediate results for these three sites, while awaiting receipt of imagery and assembling further coverage for the other areas.

In order to explore the three selected sites fully, additional data have been requested from GSFC:

(1) Computer-compatible tapes of E1209-05210 (the Thar Desert) and E1153-17103 (White Sands) have been requested in order to test the advantages of digital processing of ERTS data for our project. Carol Breed has arranged for custom-processing of these tapes at the Astrogeology Center, U.S. Geological Survey, Flagstaff, Arizona (at a cost of approximately \$50 each).

(2) Existing aerial photography to supplement ERTS imagery of selected U.S. sites has been requested from GSFC and other sources. These sites include White Sands, the Yuma Desert of California and Mexico, and the dunés of the Navajo Country in northeastern Arizona. These are sites where ground truth is immediately available from previous field work by the Principal Investigator.

(3) Additional data from the White Sands dune field, including ground level infrared and color photography, and the collection and analysis of sand samples, were obtained from field work by McKee, Breed, and Harris May 25-26, 1973. Possibly some additional aerial photography of this site can be obtained through cooperation with the Superintendent, White Sands National Monument, and with the adjacent USAF base.

(4) Experimentation to determine the characteristic optical reflectance of representative sand samples from dune fields in Africa, Asia, and Australia (previously collected by the Principal Investigator) continues at the U.S.G.S., Denver, as described in the Type II Progress Report of 1 January 1973.

e. Results and application:

(1) The inventorying and classifying of dune field type morphologies continues, as outlined in the Type I Progress Report of March 1, 1973.

(2) Examination of sand samples from both dune and interdune areas at White Sands, New Mexico, indicates marked differences in composition and texture between these two types of facies. If these differences are characteristic of dune fields in general, information concerning them may help to explain the contrast in appearance of the two kinds of sand areas on ERTS imagery and to permit interpretation of similar features in remote areas, such as Saudi Arabia, difficult to visit.

(3) A visit to the National Center for Atmospheric Research, Boulder, Colorado, by L. F. Harris in April, 1973, has resulted in some surface wind data becoming immediately available, with the promise of more ground truth of this type to come in the future.

(4) Our project has been aided by contact with the Office of Arid Lands Studies, University of Arizona, Tucson; in particular with the investigators of GSFC No. UN 613: A study to explore the use of orbital remote sensing to determine native arid plant distribution. This informal contact continues to be mutually helpful.

Also, Mr. Herbert Schumann of the U.S.G.S., Phoenix, Arizona, has been helpful to the project by making available resources of the Arizona Regional Ecological Test Site data center in Phoenix:

f. Reports: None

g. Changes in operation:

Mr. Larry Harris concluded his service as a coinvestigator on this project, by resignation for personal reasons from the U.S. Geological Survey, effective June 22, 1973.

- h. Changes in standing order forms: None
- i. ERTS Image Descriptor forms: Attached
- j. Data Request forms: Attached